

CLAIMS

1. A method for up-interpolating a Bayer mosaic image from input space to output space, said Bayer mosaic image comprising a plurality of four-pixel blocks, each pixel in said blocks being one of three different colors with one of two of said pixels being a dominant color and two of said pixels being non-dominant colors, said method including the steps of:  
reading a two dimensional color plane of said Bayer image for each said color;  
mapping said pixels of said dominant color from said input space to said output space by:

multiplying each ordinate of said input space by  $1/\sqrt{2}$ ; and  
scaling coordinates of said input space to a normalized coefficient kernel by multiplying said ordinates by  $1/\sqrt{2}$ ;

mapping said pixels of said non-dominant colors by multiplying each ordinate of said input space by  $1/2$ ;

for each color, convolving said input space pixels with a coefficient kernel for each color; and  
writing said mapped pixels to a storage location.

2. The method of claim 1 wherein said three different colors are red, green and blue.

3. The method of claim 1 or 2 wherein said dominant color is green.

4. The method of claim 1 wherein said coefficient kernel is the same for said two non-dominant colors but different for said dominant color.

5. The method of claim 1 wherein, for said dominant color, said mapping step further includes sampling a 4x4 pixel block. (which is 4x4)

6. An apparatus for up-interpolating a Bayer mosaic image from input space to output space, said Bayer mosaic image comprising a plurality of four-pixel blocks, each pixel in said blocks being one of three different colors with one of two of said pixels being a dominant color and two of said pixels being non-dominant colors, said apparatus comprising:

an input buffer for each color for storing said input space pixel values;  
a coefficient kernel for each color, said coefficient kernel for said dominant color being normalized;

a convolve unit for each color for convolving said input space pixel values with said kernel coefficients; and <sup>for the 3 colors?</sup>

an output buffer for storing mapped pixel values. (defined mapped pixel values?)

7. The apparatus of claim 6 further comprising processing means for sampling a 4x4 pixel block for said dominant color.

8. A method of interpolating a Bayer image of red, green and blue pixels from an input space to an output space, the method including the steps of:

receiving the Bayer image; and <sup>of the input space</sup>  
mapping each of the colors to the output space in accordance with the following equations:

$$x'=(x/ops)+k_1$$

$$y'=(y/ops)+k_2$$

where x,y is a coordinate in the output space, x'y' is the coordinate in the input space, ops is the number of pixels in the output space per input space sample, and k<sub>1,2</sub> are either 0 or 0.5 depending on the color and the desired relative rotational orientation of the image. 112 ✓

9. The method of claim 8 wherein, for the green pixels in the input space, each ordinate of the input space is multiplied by 1/√2.

10. The method of claim 8 wherein, for the green pixels in the input space, each coordinate of the input space is multiplied by 1/√2.

11. A method of sampling a Bayer image having two dimensional planes of red, green and blue pixels, the method including the steps of:

rotating the green plane by 45°;

sequentially sampling an m x m pixel block of the rotated plane, where m is an integer greater than 1;

providing <sup>it addresses</sup> an address for the m<sup>2</sup> samples by determining a starting address for a first of the samples and thereafter applying a predetermined fixed sequence of offsets to obtain the addresses of the remaining samples. ✓

12. The method of claim 11 wherein the step of determining the starting address is responsive to the relative rotational orientation of the image. 112 sub ✓

13. The method of claim 11 wherein m=4 and there are sixteen offsets.

14. An apparatus for sampling a Bayer image having two dimensional planes of red, green and blue pixels, the apparatus comprising:

input means for rotating the green plane by 45°;

processing means for sequentially sampling an  $m \times m$  pixel block of the rotated plane, where  $m$  is an integer greater than 1;

address means for providing an address<sup>21</sup> for the  $m^2$  samples by determining a

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starting address for a first of the samples and thereafter applying a

predetermined fixed sequence of offsets to obtain the addresses of the remaining samples.

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